

January 19, 1832.

JOHN BOSTOCK, M.D. Vice-President, in the Chair.

A paper was read, entitled "On the Theory of the Perturbations of the Planets." By James Ivory, Esq. A.M. F.R.S., Instit. Reg. Sc. Paris., & Reg. Sc. Gotting., Corresp.

The methods hitherto employed by mathematicians for determining the variations which the elements of the orbit of a planet undergo in consequence of perturbation, and for expressing these variations analytically in the manner best adapted for computation, are found to depend upon a theory in mechanics, of considerable intricacy, known by the name of the *Variation of the Arbitrary Constants*. In seeking the means for abridging the severe labour of the calculations, we must separate the general principles on which they are founded from the analytical processes by which they are carried into effect; and in some important problems great advantage is obtained by adapting the investigation to the particular circumstance of the case, and attending solely to the principles of the method in deducing the solution. The author suggests the possibility of simplifying physical astronomy by calling in the aid of only the usual principles of Dynamics, and by setting aside every formula or equation not absolutely necessary for arriving at the final results.

The present paper contains a complete determination of the variable elements of the elliptic orbit of a disturbed planet, deduced from three differential equations, that follow readily from the mechanical conditions of the problem. In applying these equations the author observes, the procedure is the same whether a planet is urged by the sole action of the constant force of the sun, or is besides disturbed by the attraction of other bodies revolving round the luminary; the only difference being that, in the first case, the elements of the orbit are all constant, whereas in the other case they are all variable. The success of the method followed by the author is derived from a new differential equation between the time and the area described by the planet in its momentary plane, which greatly shortens the investigation by rendering it unnecessary to consider the projection of the orbit. But the solution given in the present paper, although it makes no reference to the analytical formulæ of the theory of the *Variations of the Arbitrary Constants*, is no less an application of that method, and an example of its utility, and of the necessity of employing it in very complicated problems.

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January 26, 1832.

JOHN WILLIAM LUBBOCK, Esq. M.A. V.P. and Treasurer,  
in the Chair.

The reading of a paper, entitled "Experimental Researches in Voltaic Electricity", by the Rev. William Ritchie, LL.D. F.R.S. Professor of Natural and Experimental Philosophy in the Royal In-